

Doc Code: AP.PRE.REQ

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**PRE-APPEAL BRIEF REQUEST FOR REVIEW**

Docket Number (Optional)

24-NS-120423-6

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]

on \_\_\_\_\_

Signature \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Application Number

10/714,417

Filed

11/14/2003

First Named Inventor

Sitaraman et al.

Art Unit

3663

Examiner

R. Palabrica

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest.  
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.  
(Form PTO/SB/96)

☒ attorney or agent of record. 42,180  
Registration number \_\_\_\_\_

☐ attorney or agent acting under 37 CFR 1.34.

Registration number if acting under 37 CFR 1.34 \_\_\_\_\_



Signature

Michael Tersillo

Typed or printed name

314-621-5070

Telephone number

April 3, 2007

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below\*.

☒ \*Total of 1 forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



Express Mail Label No. EV829960315US

24-NS-120423-6  
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Sitaraman et al.	:	
	:	Art Unit: 3663
Serial No.: 10/714,417	:	
	:	Examiner: R. Palabrica
Filed: November 14, 2003	:	
	:	
For: SYSTEMS AND METHODS FOR	:	
ESTIMATING HELIUM PRODUCTION	:	
IN SHROUDS OF NUCLEAR	:	
REACTORS	:	

**ARGUMENTS IN SUPPORT OF PRE-APPEAL BRIEF REQUEST FOR REVIEW**

The rejection of Claims 1, 3-7, 10, 12-15, and 18-19 under 35 U.S.C. § 112, first paragraph, is respectfully traversed.

Applicants respectfully submit that contrary to the suggestion at pages 2-7 of the Office Action, the application contains a written description in such full, clear, concise, and exact terms as to enable one skilled in the art to make and use the invention without undue experimentation.

The claims of the present application are directed to methods of estimating the helium content of a stainless steel core shroud in a boiling water nuclear reactor. Applicants submit that the claimed method is an estimating tool and not for calculating the exact helium content of the shroud. The method provides an estimate of helium content to provide a nuclear engineer with information as to whether there might be concerns of increasing helium content in the shroud. The fluxes and fluences are routinely calculated as part of shroud repairs and inspections. The fluences are typically calculated at the shroud and at the vessel wall. The claimed methods are straightforward in that first the neutron fluence (either fast neutron fluence or thermal neutron fluence) is determined by either an actual measurement or by calculation using simulation incorporating a Monte Carlo radiation transport methodology. The Monte Carlo radiation transport methodology utilizes computer programs and nuclear data libraries that are known and available from the Department of Energy. The fluence is then used to estimate the helium content of the core shroud by using an equation developed by Applicants.

Paragraphs [0031] through [0057] provide a description of how the Monte Carlo radiation transport methodology is used to calculate fluence, including any assumptions and

approximations that are used with this methodology. Also, because simulation techniques include input as to reactor core power, the core configuration, and the operating history of the reactor, these factors are automatically accounted for by the simulation techniques. Further, a direct measurement of the fluence of a reactor is a result of these factors and as such are not something that one skilled in the art needs to take into account when using the claimed method.

The 3/2/06 Office Action, at page 2, asserts that "applicant is essentially telling an artisan that, although the equation was derived from a specific set of test conditions and parameters, it can be used for generic application on any boiling water reactor and the results are expected to be accurate". Applicants disagree with this assertion because the claimed method is used for estimating the helium content of the shroud not for determining an exact helium content.

Applicants submit that the claimed method requires calculating the fluence of the BWR or actually measuring the fluence of the BWR. As explained above, simulation programs require input on the reactor parameters, such as reactor core power, core configuration, operating history, core and shroud geometry, and the like. These parameters are then used in the calculations of the fluence. Also, as explained above, an actual measurement of the fluence automatically takes into account these reactor parameters. Because of this, the claimed method is useful for estimating helium content in all types, sizes, and different shaped BWRs.

Applicants submit that no concrete evidence, such as an article or another patent, has been provided that show that the claimed method would not work in any BWR other than the BWR that was used to develop the claimed method. Only a mere assertion has been set forth. Applicants submit that using one BWR or a pilot facility to develop tools, such as the claimed method of the present application, is routine.

Applicants also disagree with the assertion, at page 3 of the 3/2/06 Office Action, that because details as to sample placement and the specific parameters of the BWR during the development of the claimed method were not specifically disclosed, "an artisan must resort to a trial-and-error process to exercise the claimed invention". Applicants submit that this is not true. The claimed method does not require trial-and-error process. One skilled in the art knows that the parameters of a BWR are taken into account when calculating fluences in a reactor using simulation programs. As explained above, these parameters are required inputs in simulation programs. Also, simulation programs can calculate fluences at hundreds of shroud locations just

as easily as calculating the fluence at one shroud location. Applicants submit that calculating fluences at numerous shroud locations is not undue experimentation, but rather, simply practicing the claimed method.

Furthermore, Applicants submit that the assertion at page 5 of the 3/2/06 Office Action that "[a]n artisan has to verify the accuracy of the helium values calculated from the equation, in order to determine whether sufficient flux measurements at the various shroud locations have been made or whether sufficient scope of flux calculations has been done" is incorrect and has no basis. As explained above the claimed method is directed to estimating the helium content of a stainless steel core shroud in a boiling water nuclear reactor. Applicants submit that the claimed method is an estimating tool and not for calculating the exact helium content of the shroud. The claimed method produces an estimate of helium content to provide a nuclear engineer with information as to whether there might be concerns of increasing helium content in the shroud. Again, only a mere assertion has been made that the results of the claimed estimating must be validated. No concrete evidence has been provided that show that the results of the claimed estimating must be validated. Further, the reasons for the need for validation, "in order to determine whether sufficient flux measurements at the various shroud locations have been made or whether sufficient scope of flux calculations has been done" is inaccurate and is unsubstantiated by the Examiner. As explained above, calculating fluence using simulation programs are not foreign to one skilled in the art, and while not easy to use, produce validated results. These simulation programs require input on the subject reactor parameters, such as reactor core power, core configuration, operating history, core and shroud geometry, and the like. These parameters are then used in the calculations of the fluence. Also, as explained above, an actual measurement of the fluence automatically takes into account these reactor parameters. Further, Applicants submit that the claimed method was developed using a fully validated computer model that benchmarked helium production in the shroud against experimental measurements. Additional validity testing would be redundant and not needed.

In addition, Applicants submit that the assertion at pages 4-5 of the current Office Action that "the correlation coefficients in applicant's equation have been obtained are based on a plurality of factors and conditions specific to applicant's case, e.g., number of test samples and their locations, type of boiling water reactor and its properties, including power level, neutron

flux distribution across and along the core, and years of reactor operation, type of stainless steel for the shroud, including its boron content, etc." is not accurate and is just a bald unsubstantiated assertion. As explained above, the type of boiling water reactor and its properties, including power level, neutron flux distribution across and along the core, and years of reactor operation are all accounted for in the fluence calculation or measurement. Further Applicants submit that the stainless steel used in reactor core shrouds all contain boron and as such, the claimed correlation is applicable to such stainless steel shrouds.

As clearly explained in the specification, The fluence is used to estimate the helium content of the core shroud by using an equation developed by Applicants. The specification provides ranges for the variable  $b_j$  depending on the type of fluence that has been measured. One skilled in the art would understand that a simple interpolation of the  $b_j$  ranges provides the appropriate value of  $b_j$ . Also, the specification in paragraph [0023] clearly indicates that the equation recited in the claims estimates the helium production in the shroud to within 10 percent for thermal fluences up to  $1.0 \text{ e}^{21} \text{ n/cm}^2$  and for fast fluences up to  $5.0 \text{ e}^{20} \text{ n/cm}^2$ , and that beyond this fluence limit, a two-stage nickel reaction has contributions to helium production in the stainless steel shroud that exceeds 10 percent. Further, Applicants submit that paragraphs [0027] through [0030] describe how the correlation between neutron fluences and helium content in the core shroud was derived. Particularly, paragraph [0030] describes that the claimed correlation was developed using the calculated values of neutron fluences, the measured boron content of the stainless steel test samples and the known densities of stainless steel and boron.

Applicants submit that to operatively practice the invention, one has to measure or estimate the fluence and using the fluence value determine the value of  $b_j$ , and then enter these values into the recited equation to produce an estimate of the amount of helium in the stainless steel core shroud of the reactor. Applicants note that the Federal Circuit has opined in *Verve LLC v. Crane Cams, Inc.*, 65 USPQ 2d 1051, 1053-1054 (Fed. Cir. 2002), that "[p]atent documents are written for persons familiar with the relevant field; the patentee is not required to include in the specification information readily understood by practitioners, lest every patent be written as a comprehensive tutorial and treatise for the generalist, instead of a concise statement for persons in the field."

Further, Applicants submit that one skilled in the art would understand from reading the specification that the method applies to all types of stainless steel used to fabricate core shrouds in boiling water reactors. Also, Applicants submit that one skilled in the art would know from reading the specification that boron means natural boron, and that at a natural boron concentration of 3 wppm or above that impurities other than boron are insignificant because helium production is dominated by boron. Applicants further submit that the specification and the claims clearly indicate that the equation applies to boiling water reactors, and that one skilled in the art would know from reading the specification that the correlation uses an input of fluences regardless of how they are arrived at, measured or calculated, and whether the reactor was a low capacity or a high capacity reactor is irrelevant because the fluence measurements account for this. Accordingly, Applicants submit that the specification meets all the requirements of Section 112, first paragraph.

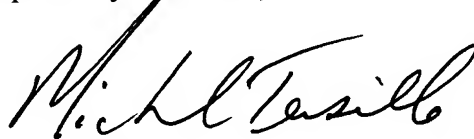
For the reasons set forth above, Applicants respectfully request that the Section 112, first paragraph, rejection of Claims 1, 3-7, 10, 12-15, 18, and 19 be withdrawn.

The rejection of Claims 1, 3-7, 10, 12-15, 18, and 19 under 35 U.S.C. § 112, second paragraph is respectfully traversed.

At least for the reasons set forth above, Applicants submit that Claims 1, 3-7, 10, 12-15, 18, and 19 are definite and particularly point out and distinctly claim the subject matter which Applicants regard as their invention. Accordingly, Applicants respectfully request that the Section 112, second paragraph, rejection of Claims 1, 3-7, 10, 12-15, 18, and 19 be withdrawn.

In view of the remarks, all the claims now active in this application are believed to be in condition for allowance. Favorable action is respectfully solicited.

Respectfully submitted,



---

Michael Tersillo  
Registration No. 42,180  
ARMSTRONG TEASDALE LLP  
One Metropolitan Square, Suite 2600  
St. Louis, Missouri 63102-2740  
(314) 621-5070